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PRECISION POWER

ELGAR CORPORATION

PRECISION POWER

INSTRUCTION MANUAL

PRECISION POWER

(1751)

Models 751A, 1001A, 1501
Power Sources

PRECISION POWER

WARNING

If at any time, during the performance of this procedure, the possibility exists to come in contact with exposed live hazardous voltage (voltage over 50 volts and 30 milliamps); the following precautions must be taken.

During the portion of the procedure where this possibility exists, appropriate PPE (Personnel Protective Equipment) must be used. Appropriate PPE includes insulating gloves, and/or insulated tools, and/or insulating and shielding materials. This is to prevent personnel from coming in contact with the exposed live hazardous voltage. PPE must have a voltage safety rating that exceeds the voltage being worked with.

Models 751A,1001A,1501
Power Sources

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July, 1973

TABLE OF CONTENTS

Paragraph		Page
	SECTION I GENERAL DESCRIPTION	
1-1	Scope of Manual	1-1
1-2	Introduction	1-1
1-3	General Description	1-1
	SECTION II SPECIFICATIONS	
	Specifications	2-1
	SECTION III OPERATION	
3-1	Inspection	3-1
3-2	Installation and Operation	3-1
	SECTION IV THEORY OF OPERATION	
4-1	Circuit Description	4-1
4-2	Power Supplies	4-2
4-3	Interconnections for Multiphase Operation	4-2
	SECTION V MAINTENANCE AND ADJUSTMENT	
5-1	Service Information	5-1
5-2	Factory Repair	5-1
5-3	Test Points	5-1
5-4	Output Regulation Adjustment	5-1
5-5	Current Limit Adjustment	5-1
5-6	Periodic Maintenance	5-2
5-7	Troubleshooting	5-2
	SECTION VI PARTS LIST AND DIAGRAMS	
	Schematic Diagram Model 751A	6-2
	Schematic Diagram Model 1001A	6-4
	Schematic Diagram Model 1501	6-6
	Parts Lists	6-9

LIST OF ILLUSTRATIONS

Figure		Page
1-1	Power Output Derating	1-2
1-2	Typical Harmonic Distortion at Rated Power	1-2
3-1	Rear Panel Terminal Strip Connections	3-2
4-1	Interconnections for Multiphase Operation	4-3
4-2	Vector Diagram	4-5
4-3	Quasi-Square Wave	4-6
5-1	Top View 751A and 1001A	5-3
5-2	Top View, 1501 and Circuit Board Layout	5-4
6-1	Schematic Diagram	6-2

SECTION I
INTRODUCTION AND GENERAL DESCRIPTION

1-1. SCOPE OF MANUAL

This manual describes the Models 751A, 1001A, and 1501 Power Sources manufactured by Elgar Corporation. It provides operating, maintenance, and adjustment instructions; circuit descriptions; schematic diagrams; and parts lists.

1-2. INTRODUCTION

The Elgar Power Sources described in this manual provide AC power at precise frequencies for testing, motor operation, and frequency conversion. The basic power amplifier consists of two DC supplies and a direct coupled amplifier driving a tapped output transformer. Nominal output voltages of the three units are; 1001A, 0-65, 0-130, 0-260 VAC; 751A and 1501, 0-32, 0-130 and 0-260 VAC. Total available output power for the three units respectively is, 1000VA, 750VA and 1500VA at full rated output voltage. Output power at less than full rated voltage is derated as illustrated in Figure 1-1. Figure 1-2 illustrates a typical harmonic distortion curve. Input power for the Model 1501 is 115/200V three phase 47-63 Hz or 230V delta. The Models 1001A and 751A may be wired for either 115 or 230V input power, 47-63 Hz single phase.

Output power frequency is established by a plug-in oscillator. Output frequency range for these units is 45 Hz to 5 KHz. A variety of plug-in oscillators is available, with frequency accuracies up to .0001%.

These Elgar Power Sources facilitate equipment tests to meet military-specification operating requirements over the frequency range of 47 to 63 Hz or 47 to 425 Hz. The basic power source output is single phase, however, multi-phase power may be obtained by stacking two or three power sources, all driven by one multi-phase plug-in oscillator.

1-3. GENERAL DESCRIPTION

These Elgar Power Sources are contained in standard rack mount enclosures. A meter for output voltage monitoring, a power on indicator lamp, a voltage amplitude control and a power circuit breaker that applies line power to the unit are located on the front panel. Cooling air for the power amplifier is drawn through a front panel grill and exhausted at the rear of the enclosure.

The enclosure contains heatsink assemblies which comprise a two section power amplifier. Control circuitry is mounted on a plug-in circuit board with test points and adjustment controls available at the top of the board. Output power is available at a rear panel terminal block and at front-panel binding posts.

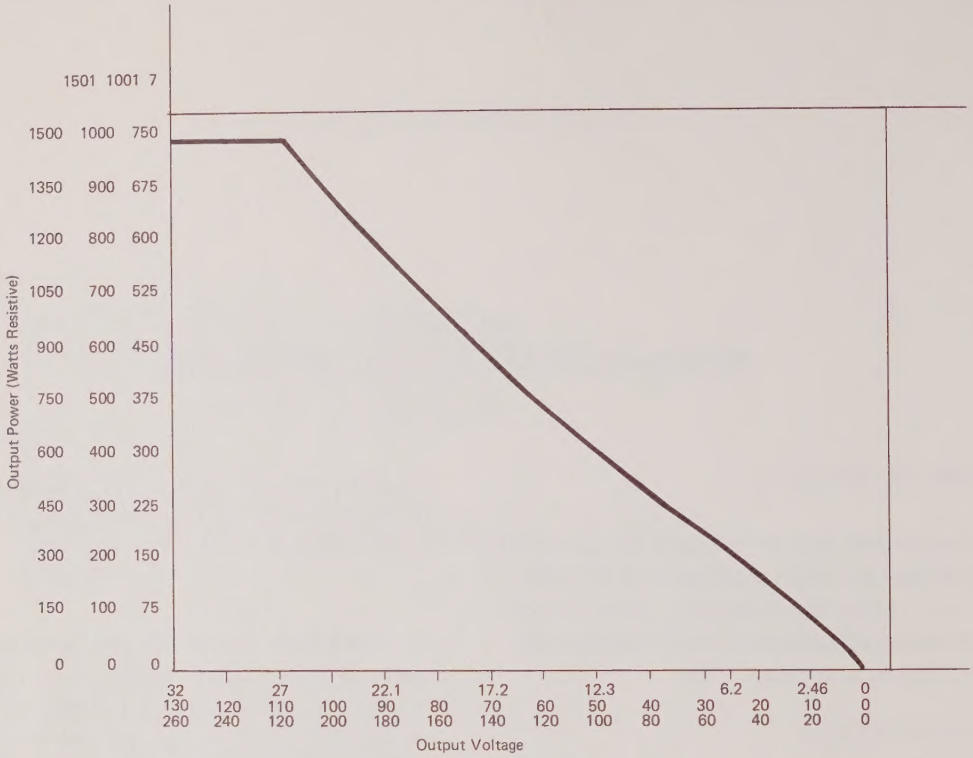

Figure 1-1. Power Output Derating

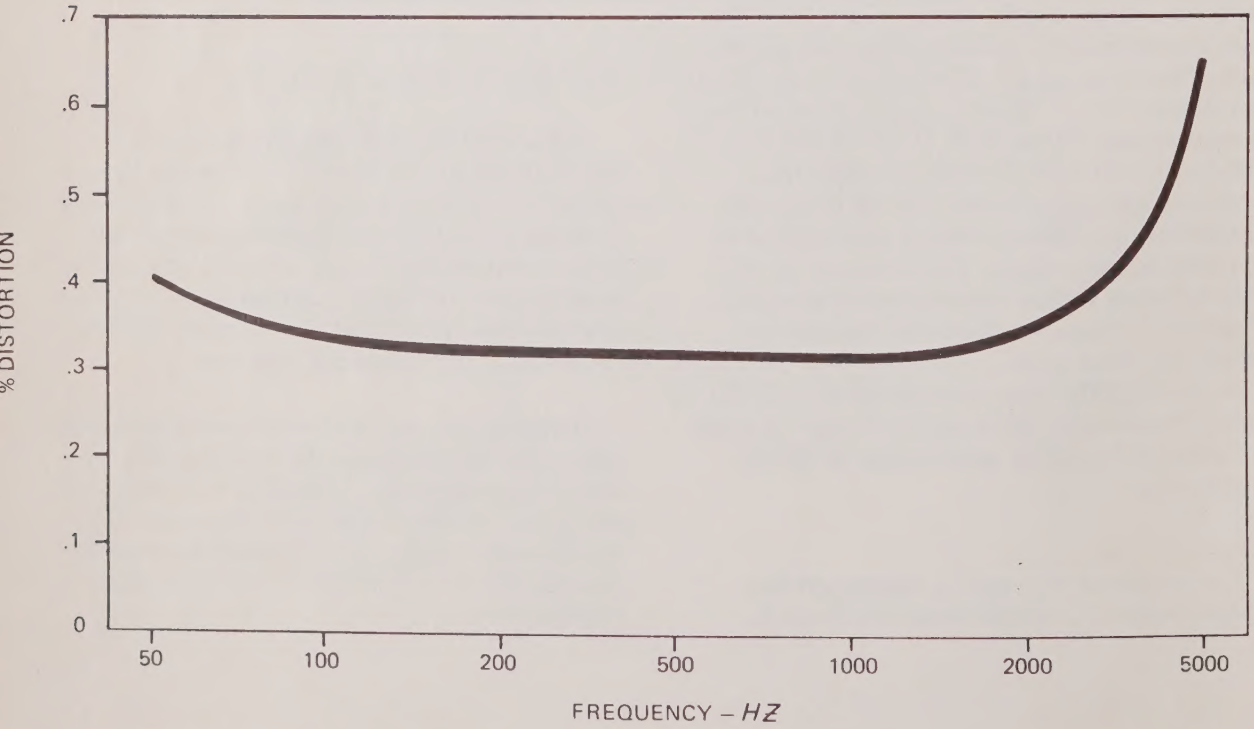

Figure 1-2. Typical Harmonic Distortion at Rated Power

SECTION II
SPECIFICATIONS

	751A	1001A	1501
Output Power	0-750VA	0-1000VA	0-1500VA
Power Factor		Unity to ±.7	
Output Voltage (adjustable)	0-32 0-130 0-260	0-65 0-130 0-260	0-32 0-130 0-260
Output Frequency Range		45 Hz – 5 KHz	
Output Distortion		Less than .9% 45 Hz – 5 KHz Less than .5% 100 Hz – 1 KHz	
Output Noise		70 Db below full output	
Load Regulation		±1%, No load to full load over frequency range, adjustable to zero for specific load and frequency	
Line Regulation		±.25% for 10% input line change	
Output Protection		Overload and short circuit protected, output recovers immediately when overload or short is removed.	
Input Power	One Phase, 115 or 230VAC. 47-63 Hz		3 phase, 230 L-L, L-N, 208-L-L
Temperature Range		0 – 50°C	
Dimensions	7" x 9" x 20" deep	12¼" x 19" x 20" deep	14" x 19" x 20" deep
Approximate Weights	120 lbs	190 lbs	225 lbs

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SECTION III
OPERATION

3-1. INSPECTION

The Elgar Power Source has been aligned and tested prior to shipment. The instrument is therefore ready for immediate use upon receipt. The following checks should be made, however, to assure that the instrument has suffered no damage during shipment.

1. Inspect the shipping container before accepting it from the carrier. If damage to the container is evident, remove the instrument from the container and visually inspect for damage to the instrument parts.

2. If any damage to the instrument or container is evident, a description of the damage should be noted on the carrier's receipt, and signed by the driver or carrier agent. Save all shipping containers and filler material for inspection.

3. Forward a report of any damage to the Elgar Service Department, 8159 Engineer Road, San Diego, California 92111. Elgar will provide instructions for repair or replacement of the instrument.

3-2. INSTALLATION AND OPERATION

1. The Elgar Power Source is designed for installation in a standard electrical equipment rack. Install the power source so that the flow of cooling air into the front panel grill and out the rear panel grill is unobstructed.

2. Insert the plug-in oscillator.

3. Connect the load to the appropriate terminal of the rear panel power output terminal block (See Figure 3-1). For bench mounted applications, the front panel binding posts may be used for 115 or 230V output on all Models.

4. Connect an input power cord on the rear panel to an appropriate source of single phase power,* 751A and 1001A, three phase power for the 1501.

5. Turn front panel power switch on. The pilot lamp illuminates indicating power is applied to the unit.

6. Adjust front panel AMPLITUDE control for the desired output voltage as indicated on the front panel voltmeter.

*See main schematic for 115V or 230V input connections

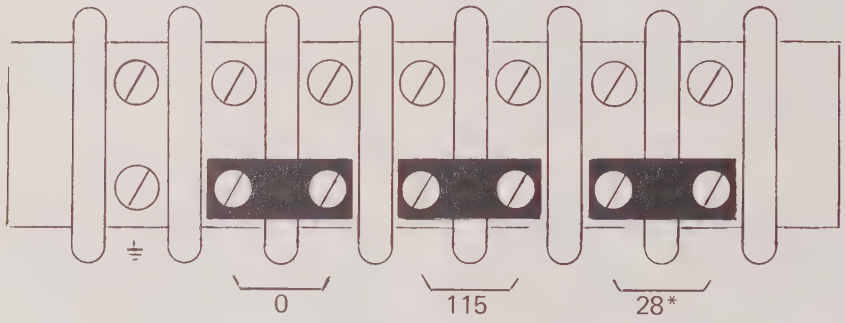
NOTE

Certain Elgar plug-in oscillators do not require the use of the front panel AMPLITUDE control. Others are remotely programmed. Consult the oscillator instruction manual.

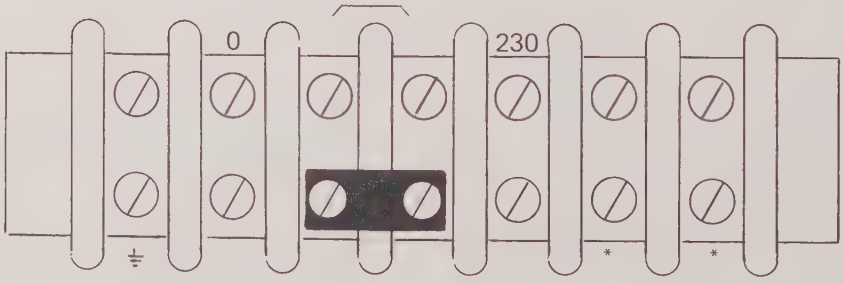
The front panel voltmeter is connected across a 0-130 VAC winding of the output transformer. For the 0-260 VAC connection, the meter indicates one half of the output voltage. When using the 0-30 VAC output connection; 28V corresponds to a reading of approximately 115V on the front panel meter.

The output of these units is floating with respect to ground. They may be operated in this mode, or with either output terminal grounded. In either case, the low side of the output should not be operated off ground in excess of 300V.

NOTE: 1751 difference data due to the higher output power capability the 1751 is supplied with higher rating transistor in the output amplifier. Refer to parts list as to the part numbers.



PARALLEL JUMPER CONNECTIONS FOR 0, 28, and 115 VAC OPERATION



SERIES JUMPER CONNECTIONS FOR 230 VAC OPERATION

* THESE CONNECTIONS NOT ON 1001A

Figure 3-1. Rear Panel Terminal Strip Connections

SECTION IV
THEORY OF OPERATION

4-1. CIRCUIT DESCRIPTION

The input signal, approximately 3V RMS is normally supplied by an Elgar plug-in oscillator, however an external signal source may be used. For most oscillators, the input signal amplitude to the amplifier is controlled by front panel amplitude control R1. The oscillator signal is applied to the first amplifier stage consisting of differential amplifier Q101 and Q102. The differential amplifier receives feedback from the output amplifier thereby maintaining approximately zero DC offset to the output transformer. The emitter currents are supplied by R106 from the +12V supply, regulated by CR101. The output of Q102 provides base drive for Q103, operating as a class A amplifier. Q103 supplies base drive for common emitter driver Q107 and emitter follower Q106. Diodes CR102-CR104 provide a small amount of forward bias to the output amplifier to minimize crossover distortion. Q106 and Q107 are drivers for emitter followers Q1 and Q2. These devices are located in the wind tunnel to provide the necessary cooling.

The power amplifier consists of a number of power transistors mounted on heatsink assemblies in the wind tunnel. The .22 ohm resistors in the emitter of each device are to ensure equal current sharing. The preamplifier and output stage are operated from nominal plus and minus 42 VDC supplies. Thermal switch S1 shown on heatsink No. 1 removes drive signal from the power amplifier in the event the amplifier overheats from excessive load or restricted airflow through the wind tunnel.

The power amplifier is also protected against overloads or short circuits on the output by current limit transistors Q104 and Q105. The current in the upper half of the power amplifier is sampled across R201 and applied to upper current limit adjustment potentiometer R126. The current signal is then applied to the base of Q104 through resistor R118. When the current signal at the base of Q104 reaches Q104's conduction threshold (approximately 0.6V), drive signal is diverted from the Q106, preventing a further increase in output current delivered by the upper half of the power amplifier. Simultaneously the current in the lower half of the power amplifier is sampled across R7 and applied to the lower current limit adjustment potentiometer. This signal is then applied to the base of Q105 through resistor R119. When the current signal at the base of Q105 reaches Q105's conduction threshold, drive signal is diverted from the base of Q107, preventing a further increase in output current of the lower half of the power amplifier.

The amplifier output (TP-2) is connected to output transformer T2, which steps up the amplifier voltage (approximately 20V RMS) to the required output level. Negative AC feedback is taken from the amplifier output to the base of Q101 through resistor R109. Capacitor C105 across R109 helps stabilize the amplifier against high frequency instabilities.

Output load regulation is accomplished by passing the wire from the amplifier output through current transformer, T3 to the output transformer. As load

is applied to the output of the unit a positive feedback signal is developed at the secondary of T3 and applied across shunt resistor R125 and regulation adjustment potentiometer R124. This signal is then applied to the input of the differential amplifier through R103. Capacitor C102 and resistor R102 comprise a boost network to increase the positive feedback at the higher output frequency ranges to maintain regulation.

4-2. POWER SUPPLIES

Plus and minus 42V DC for the amplifier is developed by full wave bridge rectification at the secondary of T1. Filter capacitors and supply bleeder resistors are connected across the output of the bridge.

4-3. INTERCONNECTIONS FOR MULTIPHASE OPERATION

Two or three power sources may be interconnected to generate two or three phase AC power. Two or three phase signals are developed by a multiphase oscillator installed in the A phase power amplifier. Signals from the oscillator are routed to the B phase and or C Ø power amplifiers through a signal interconnect cable. These signals are then applied to the front panel amplitude control on each amplifier by the signal routing plug-in which must be installed in the unit(s). Upon initial calibration of the system the voltage of the A phase unit is adjusted to some value (i.e.) 115 VAC. The other phase amplifier(s) output voltages is then adjusted by means of their front panel amplitude controls to equal the output voltage of A phase. After this initial calibration has been accomplished, the voltage control on the A phase amplifier is used to vary the output voltage of all phases simultaneously and equally.

Two phase operation requires two power sources. Three phase operation may be accomplished with three power sources, two power sources in open delta configuration, or two power sources in phantom wye configuration. Refer to Figure 4-1 for output interconnect information for the various systems.

OUTPUT CONFIGURATION FOR MODELS 751A & 1501

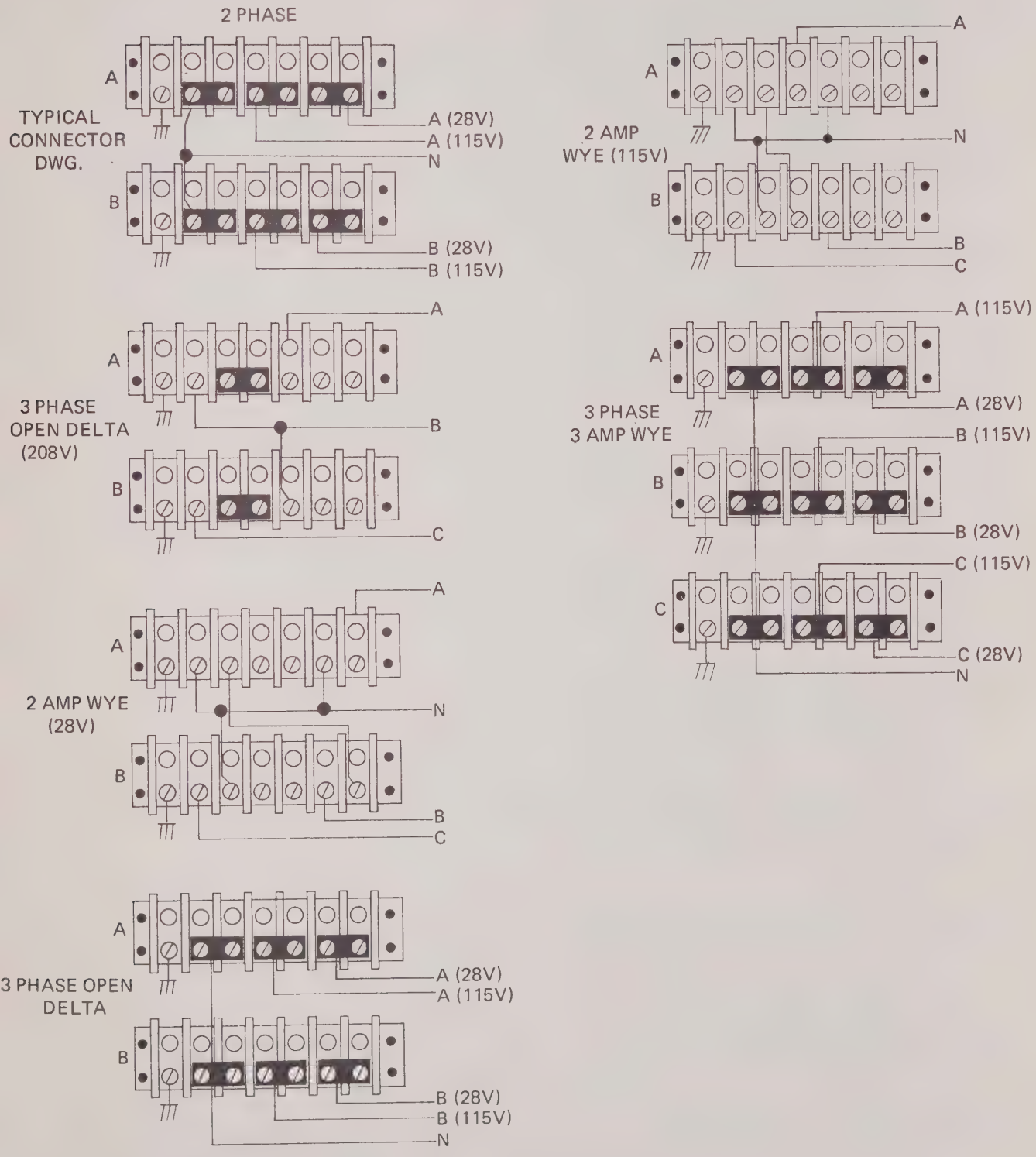
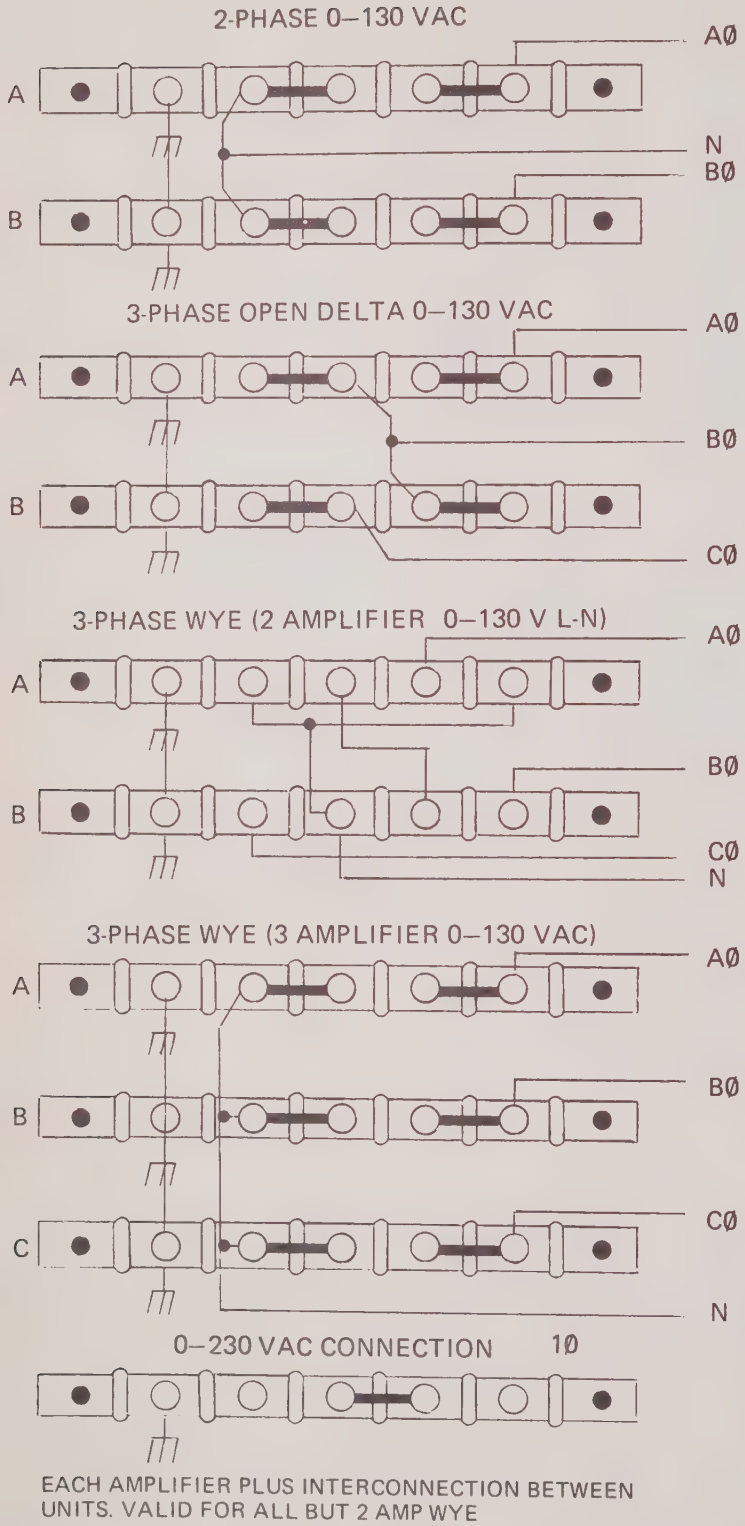
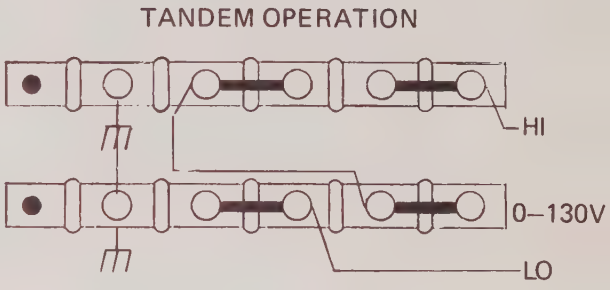


Figure 4-1. Interconnections for Multiphase Operation

OUTPUT CONFIGURATIONS FOR MODEL 1001A



EACH AMPLIFIER PLUS INTERCONNECTION BETWEEN UNITS. VALID FOR ALL BUT 2 AMP WYE



NOTE: FOR TANDEM OPERATION INTERNAL JUMPERS FOR OUTPUT TRANSFORMER MUST BE CHANGED REFER TO 1001A SCHEMATIC

FOR TANDEM OPERATION, 260V OUTPUT USE STD. INTERNAL CONNECTIONS AND 0-130V OUTPUT. SEE FIG. 6-1

Figure 4-1. Interconnections for Multiphase Operation

4-3. Continued

In the open delta configuration two power amplifiers of equal VA rating are driven by a standard three phase oscillator having 120° phase angle between ØA, ØB and ØC. An open delta requires that the two amplifiers have a 60° phase angle between them and this is accomplished by inverting the second amplifier.

In these systems the amplifier containing the plug-in oscillator is referred to as the master or A phase source. The second amplifier is referred to as the slave or B phase source.

The open delta hook-up shown in Figure 4-1 page 4-3 is shown below as a vector diagram in Figure 4-2.

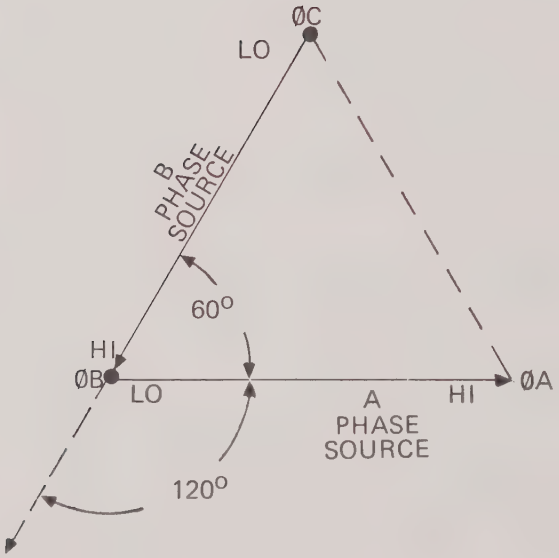


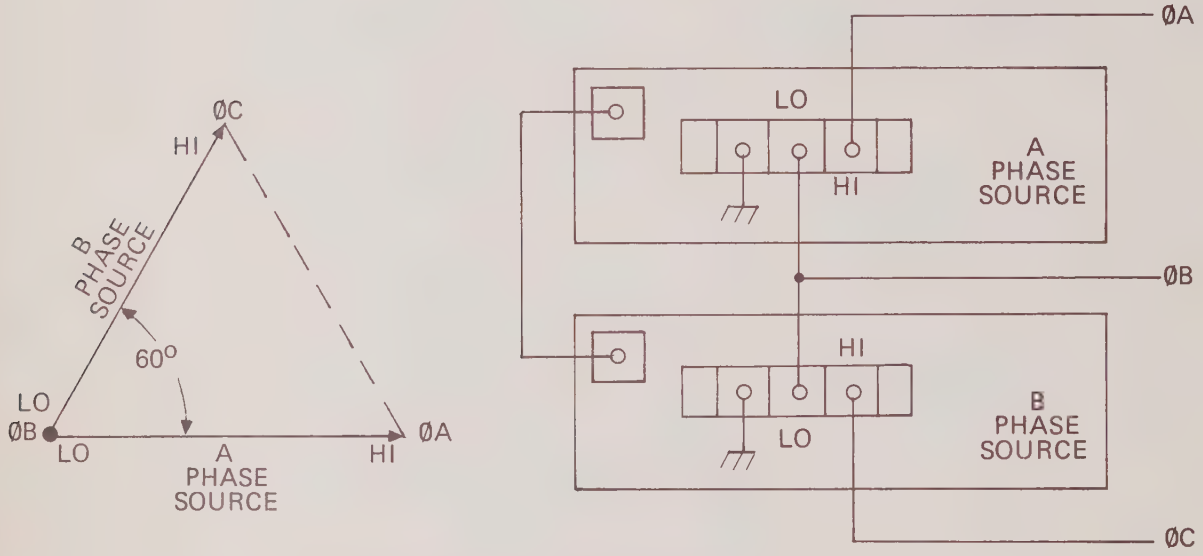
Figure 4-2

4-3. Continued

Certain specialized oscillators such as the Super-Stable (SS) series and the Quasi-Square wave series are designed only for open delta configurations using two amplifiers and have the phase angle between the ØA and ØB drive signals at 60°.

When using the SS series or quasi-square wave systems the inter-connections would be per Figure 4-3.

QUASI-SQUARE WAVE SUCH AS 443-1-111



SUPER STABLE SUCH AS 443-.01SS

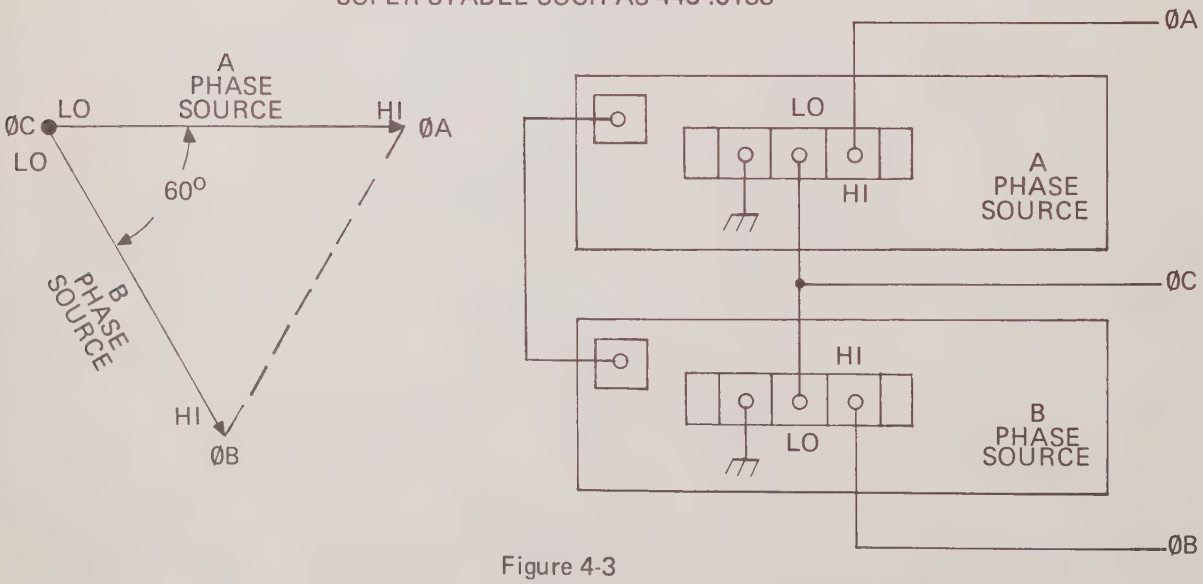


Figure 4-3

SECTION V
MAINTENANCE AND ADJUSTMENT

5-1. SERVICE INFORMATION

Questions concerning the operation, repair or servicing of this instrument should be directed to the nearest Elgar representative or to the Service Department, Elgar Corporation, 8159 Engineer Road, San Diego, California 92111. Include the model number and serial number in any correspondence concerning this instrument.

5-2. FACTORY REPAIR

Should it be necessary to return an instrument to the factory for repair, please contact the Elgar Corporation Service Department for authorization to make shipment. DO NOT return the unit without authorization.

5-3. TEST POINTS

Test points and adjustment controls are conveniently provided at the top of the amplifier circuit board, accessible by removing the top cover of the instrument (see Figure 5-1). The test points are as follows:

TP1 — Circuit common — Turret terminal
TP2 — Amplifier output — Red
TP3 — Oscillator signal — Orange

5-4. OUTPUT REGULATION ADJUSTMENT

The regulation adjustment, R124, is set at the factory to give ±1% load regulation over the full frequency range of the power source. The regulation may require re-adjustment if the load is highly reactive or if zero regulation is desired for a specific load and frequency. To make this adjustment, disconnect the load and read the output voltage. Connect the load and adjust R124 until the same reading is obtained.

NOTE

If the load is heavy enough to cause current limit transistors Q104 and Q105 to conduct, the output voltage will be reduced, giving an indication of poor load regulation. Load voltage fall-off due to current limiting action should not be compensated by the regulation adjustment.

5-5. CURRENT LIMIT ADJUSTMENT

The current limits have been preset at the factory such that the unit will deliver full rated power at rated output voltage. Re-adjustment of the limits should not be performed unless a malfunction has occurred in the unit, parts have been replaced and re-adjustment of the limits is indicated.

Current limit adjustment may be checked by observing the waveform at TP-2 with an oscilloscope.

(1) Set scope sensitivity to 10 v/cm.

(2) Turn unit on and adjust output for 110 VAC as indicated on the front panel meter.

(3) Connect 16.2 ohm load to output terminals of 751, 12.1 ohm on the 1001A, 8.1 ohm for the Model 1501.

(4) Adjust current limit pots CW until clipping is observed at TP-2. Adjust limit pots CCW until clipping just disappears.

5-6. PERIODIC MAINTENANCE

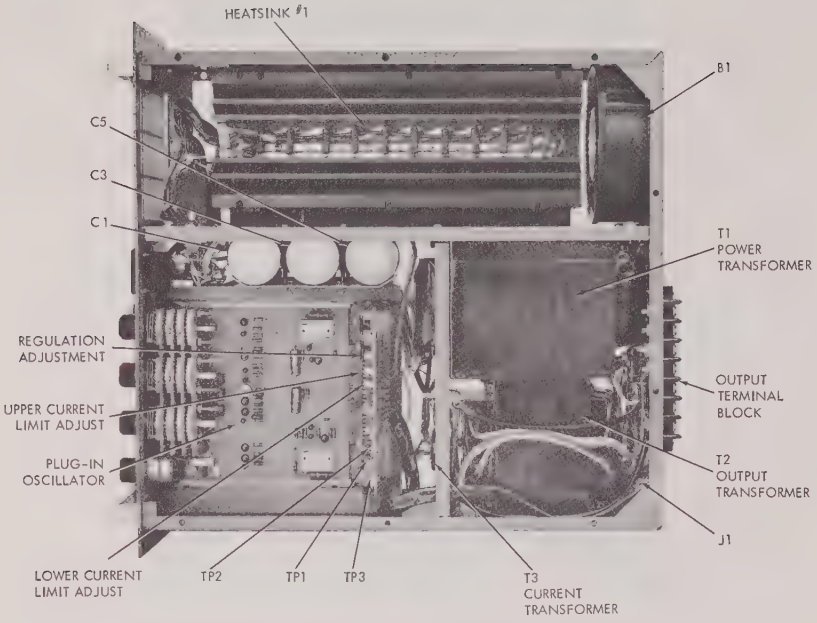
The only periodic maintenance required by the power source is occasional cleaning of the heat sinks. The heat sinks may be inspected through the front panel air grill. If enough dust and dirt have accumulated to restrict the air flow, an air jet should be directed through the front panel grill while the instrument is operating. If this does not dislodge the dirt, the heat sink must be removed to be cleaned.

5-7. TROUBLESHOOTING

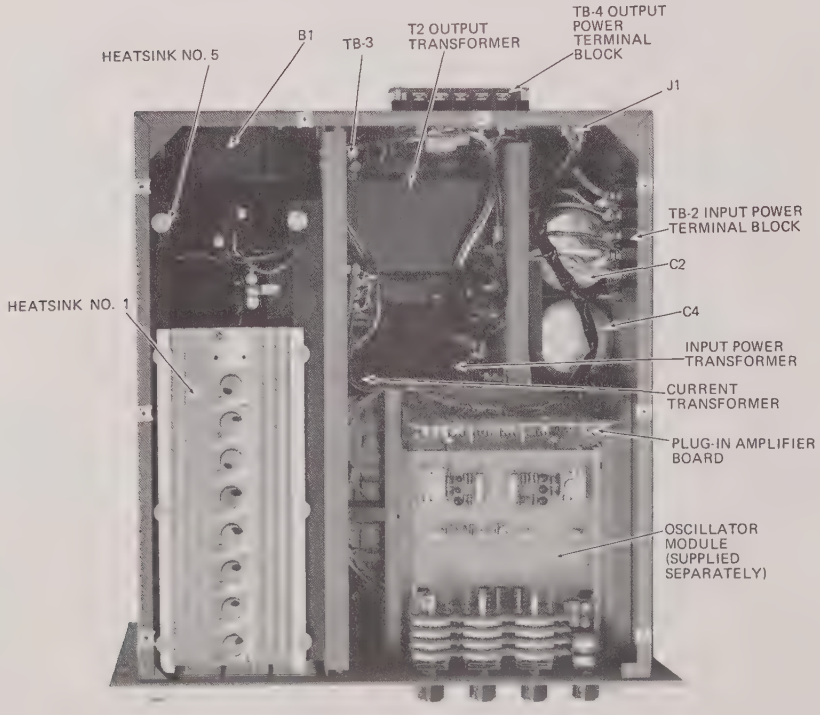
5-8. CIRCUIT BREAKER TRIPS. If the circuit breaker trips at no load, a fault in either the power transistors or power rectifiers is indicated. Unplug both heat sinks and try the circuit breaker. If it does not trip, look for a shorted power transistor, (power transistors can be tested with an ohmmeter). If the circuit breaker still trips, look for a shorted rectifier bridge. If all diodes and filter capacitors are good, a fault in the power transformer or wiring harness is indicated.

5-9 OUTPUT DISTORTION. Output distortion may be caused by overloading. Check the load current waveform with an oscilloscope since some high crest factor loads may draw considerably more peak current than is indicated by a load ammeter.

5-10. OVERHEATING. If overheating causes thermostat S1 to close, the output voltage will fall to zero. Overheating may be caused by restricted air flow or excessive environmental temperature (greater than 50^{o}C).

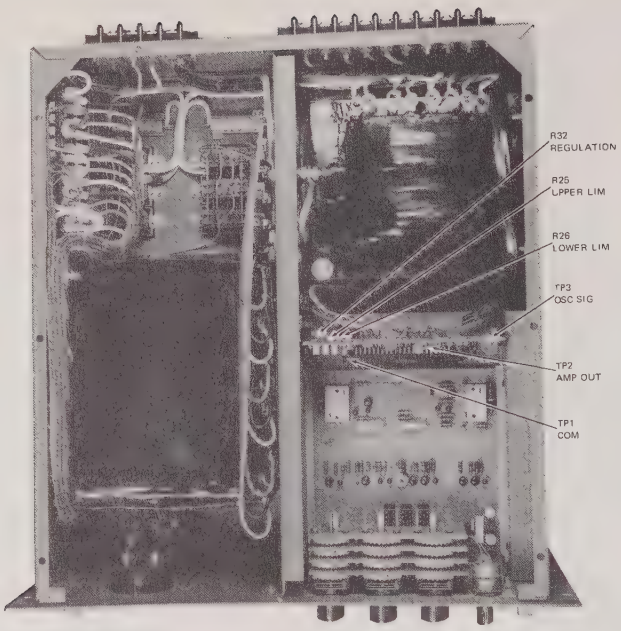


Model 751A Top View



Model 1001A Top View

Figure 5-1. Top View



Model 1501 Top View

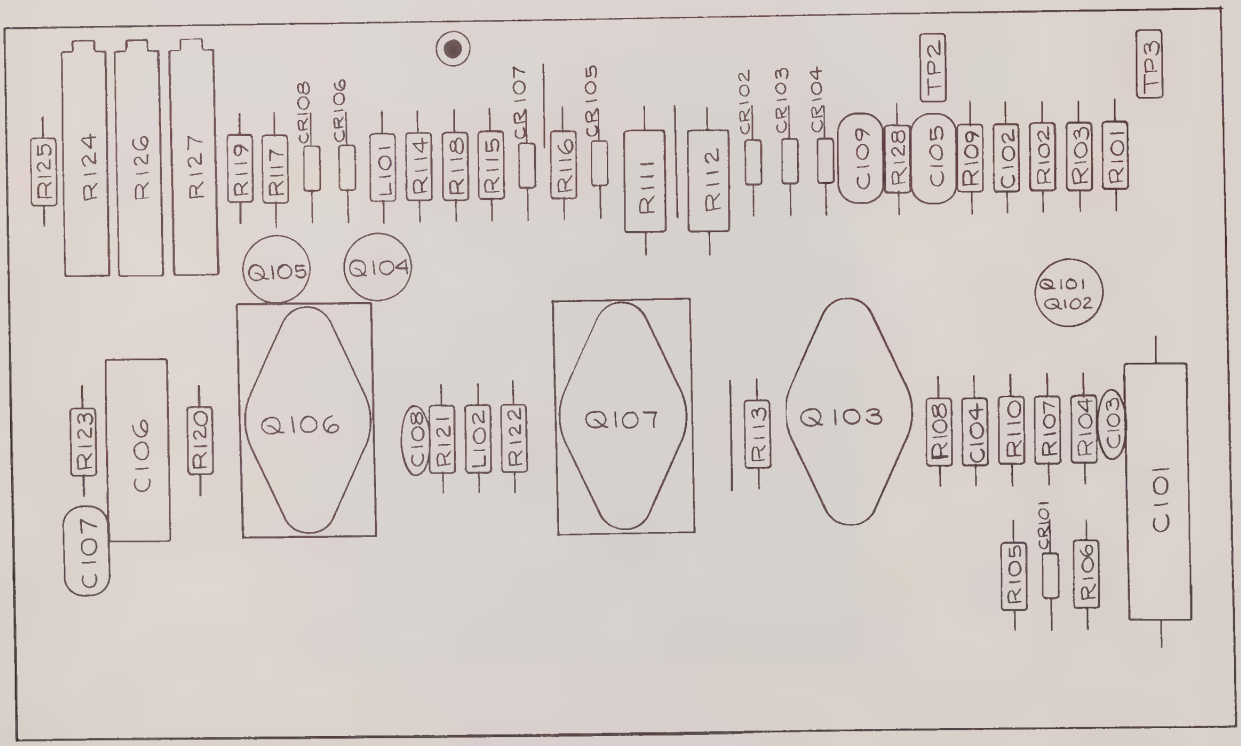
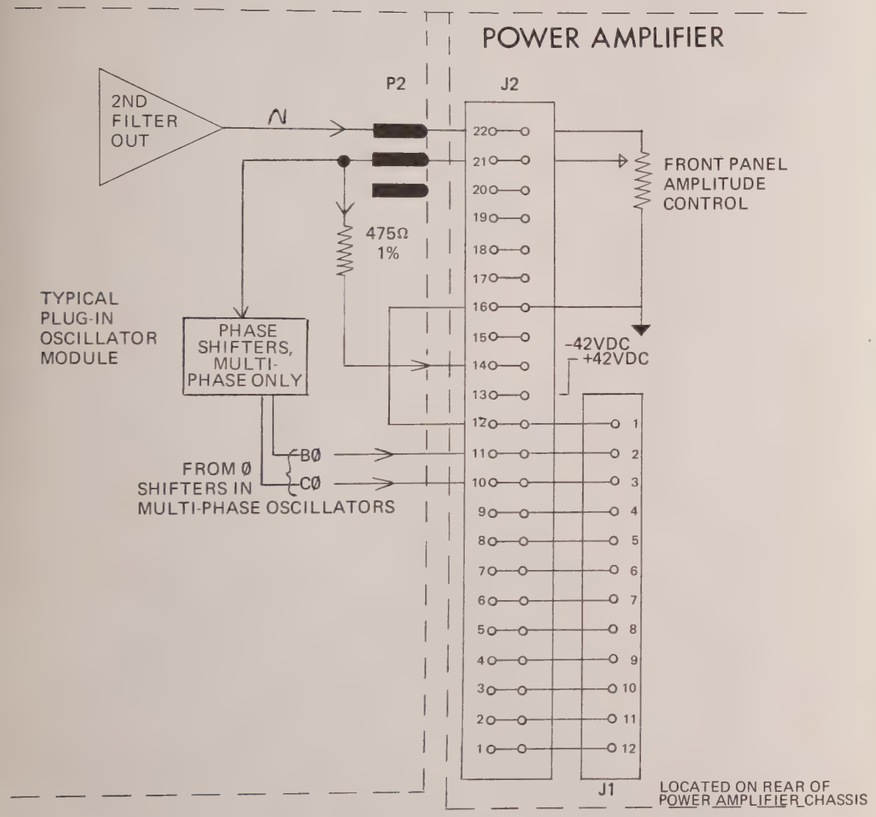


Figure 5-2. Circuit Board Layout

SECTION VI
PARTS LIST AND DIAGRAMS



Typical Plug-in Oscillator Power Amplifier Interconnection

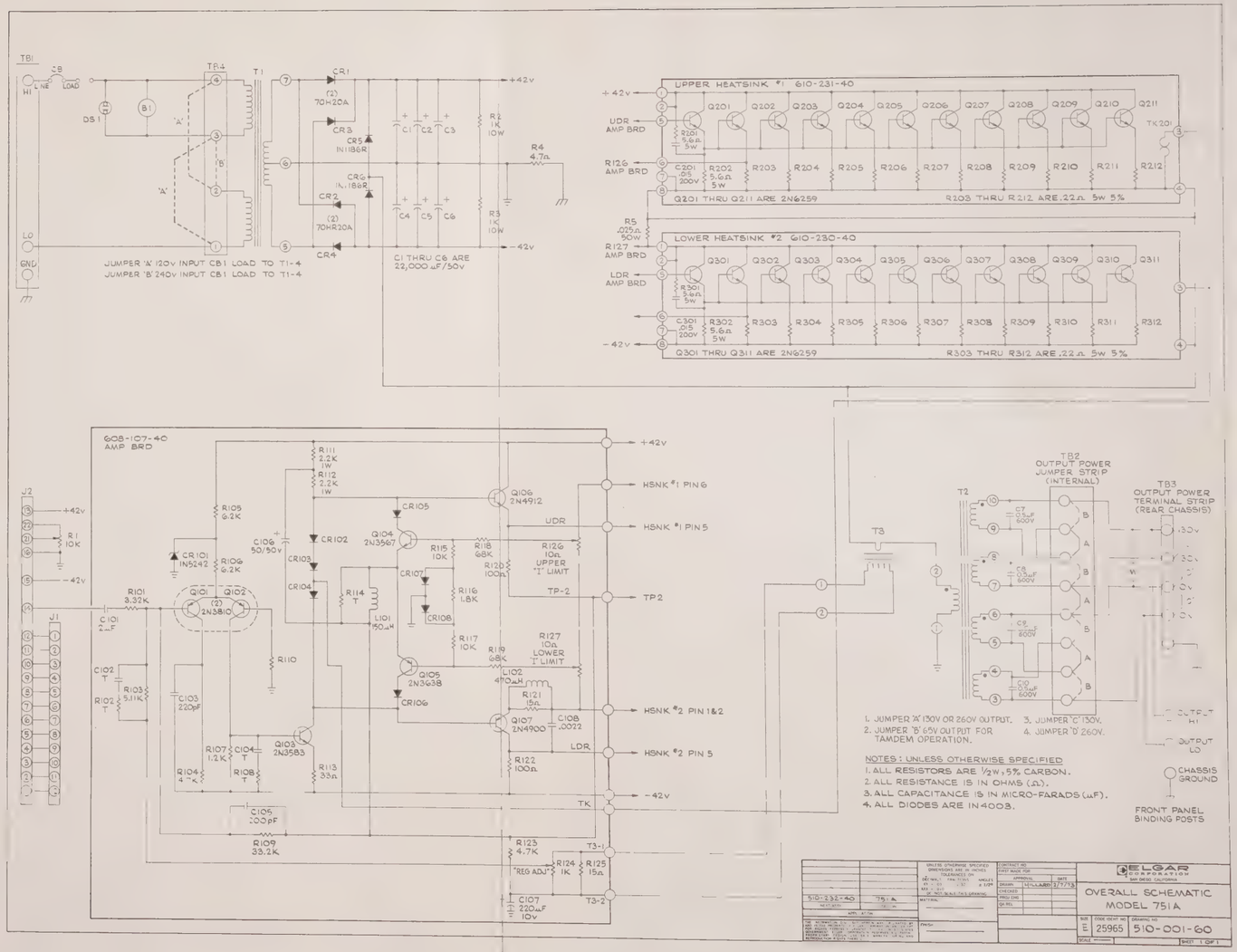
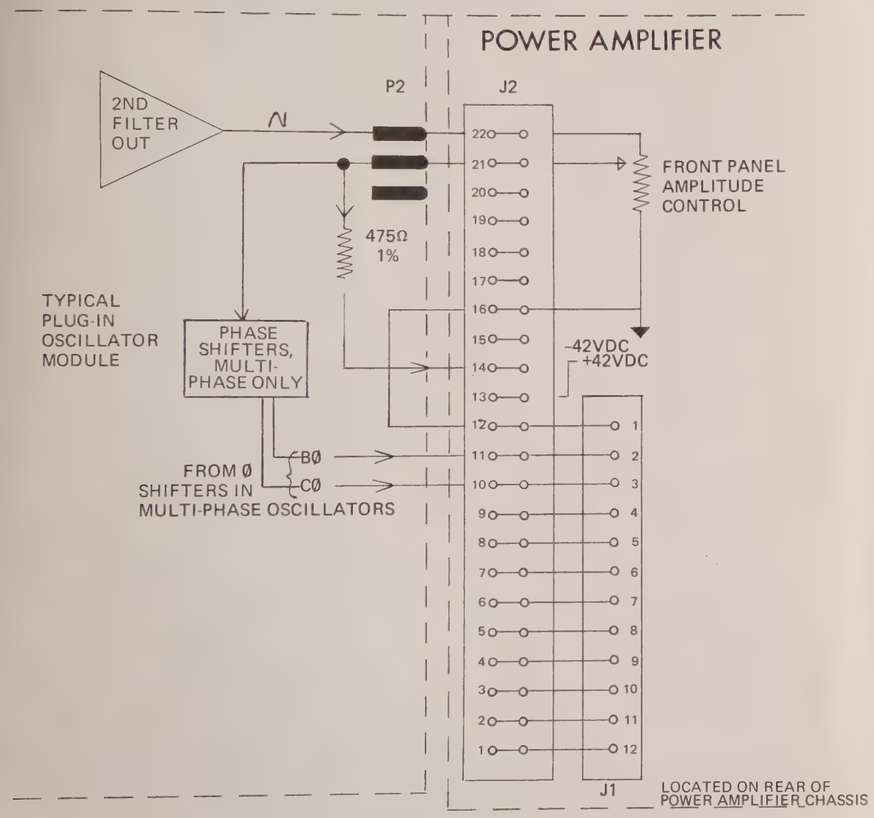
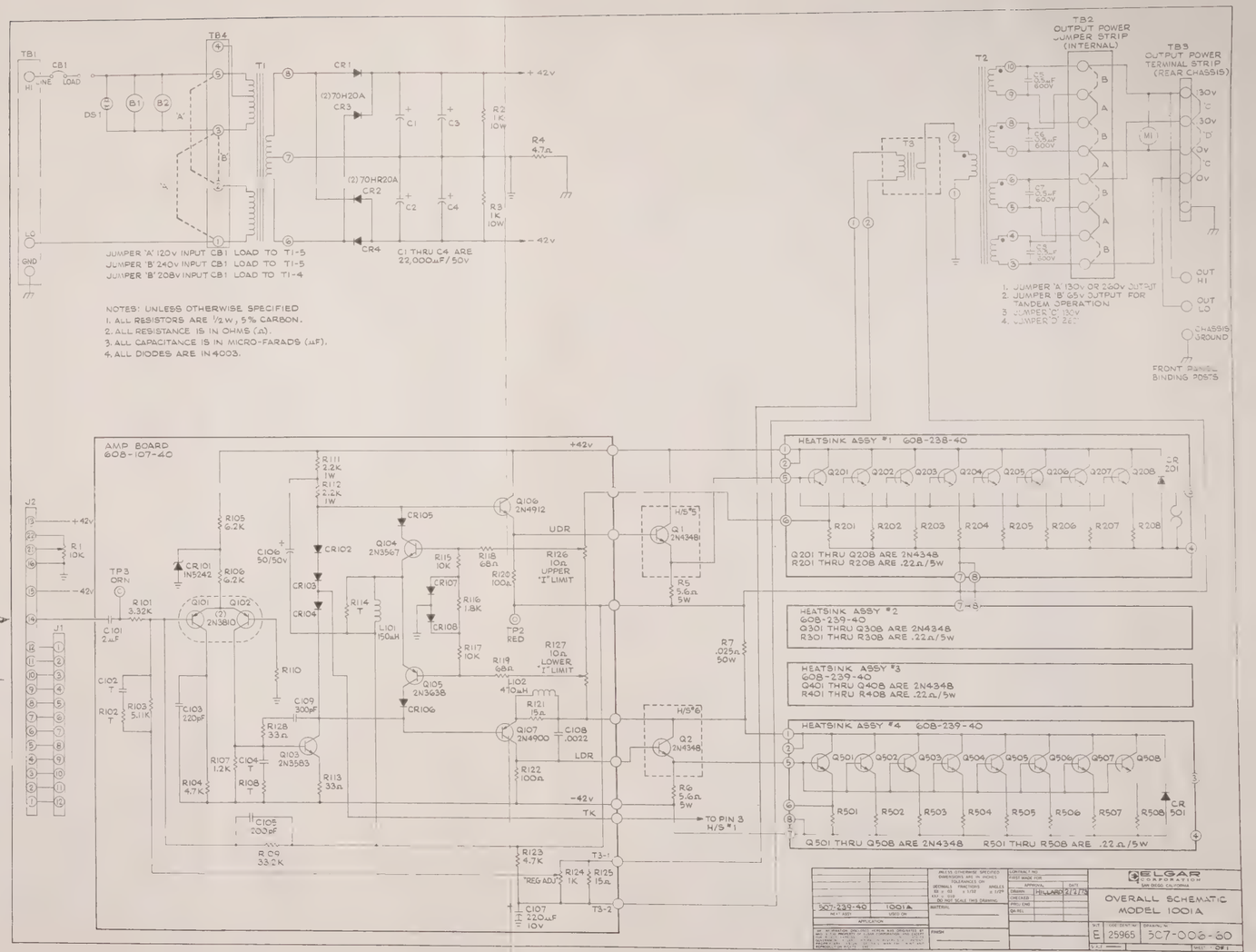


Figure 6-1. Schematic Diagram Model 751A

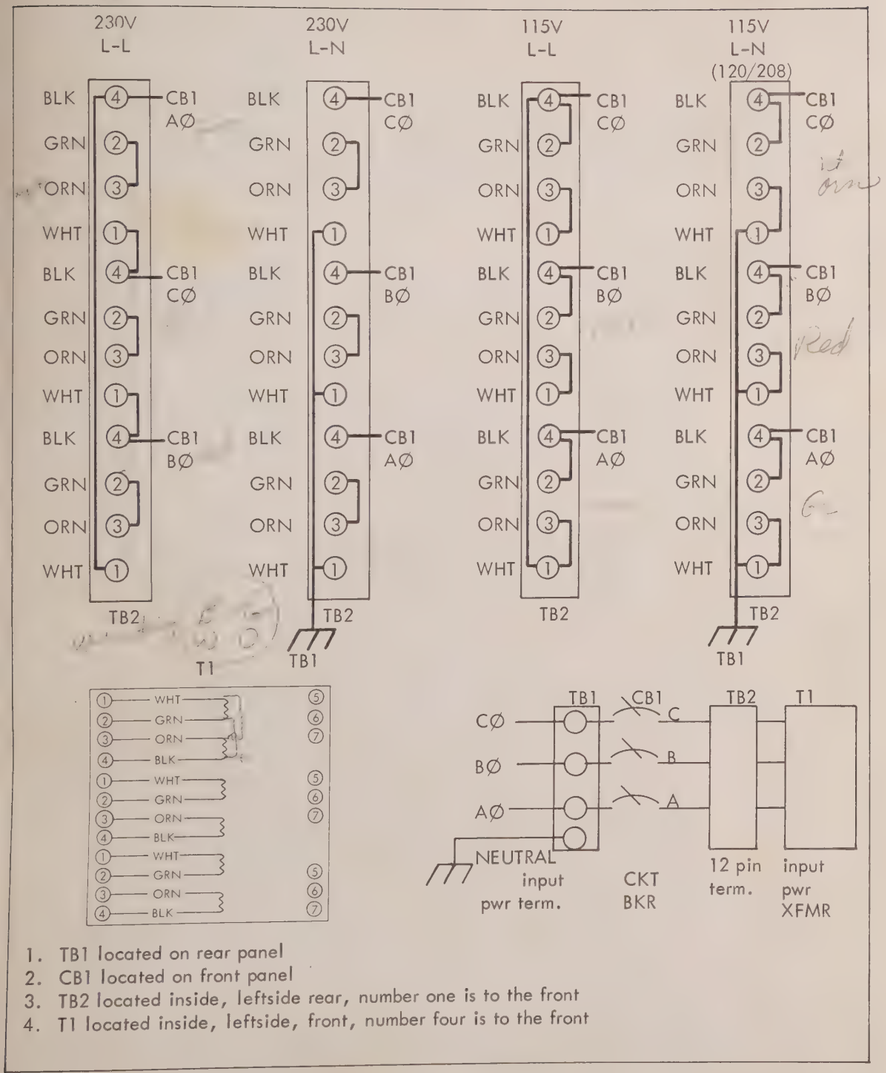


Typical Plug-in Oscillator Power Amplifier Interconnection



cut TP3
input s/b
30 Rms ov
6.5v P-P for
Full output

Figure 6-2. Schematic Diagram Model 1001A



1. TB1 located on rear panel
2. CB1 located on front panel
3. TB2 located inside, leftside rear, number one is to the front
4. T1 located inside, leftside, front, number four is to the front

Input Power Configuration

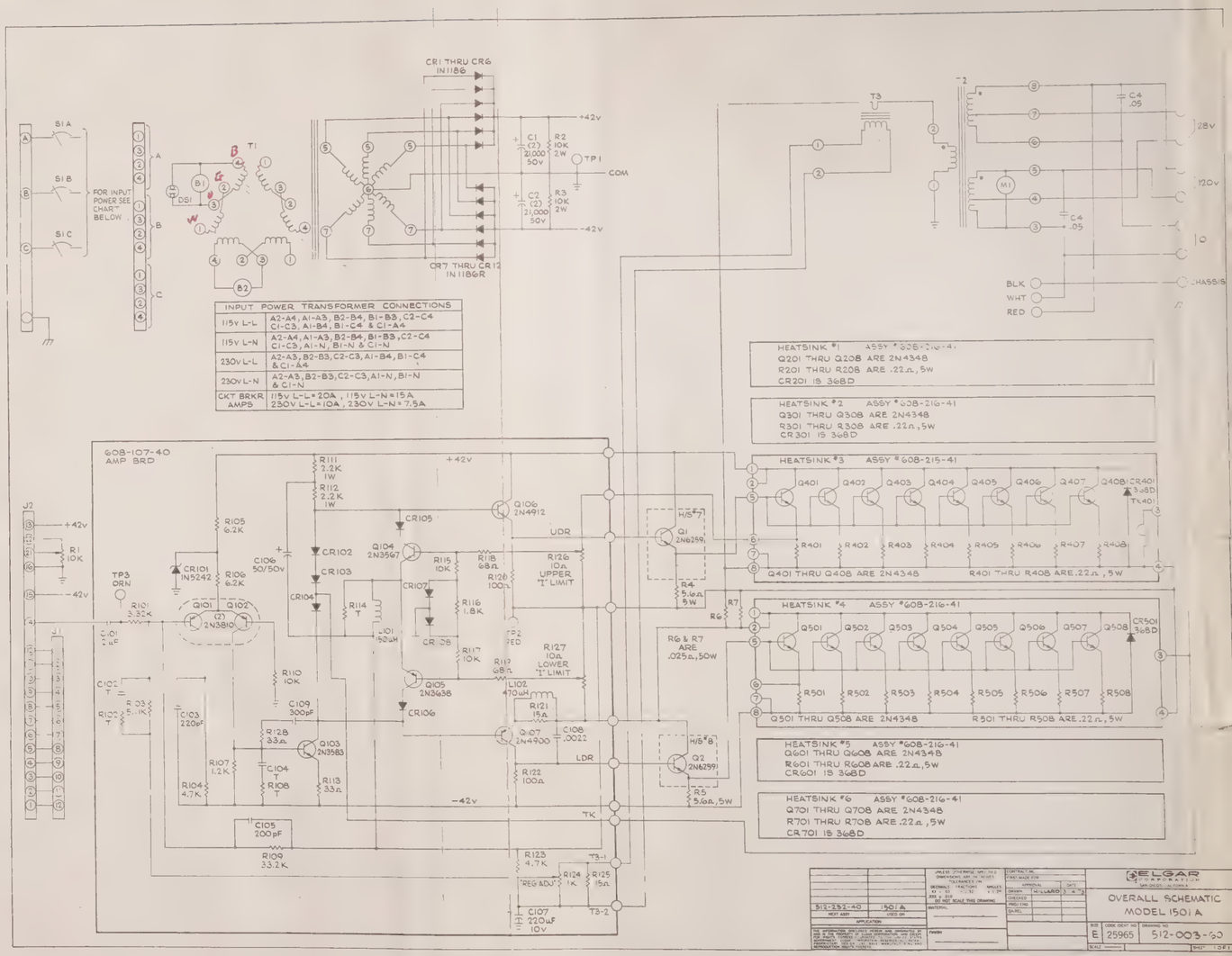


Figure 6-3. Schematic Diagram Model 1501

AMPLIFIER BOARD 608-107-40

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION TYPE	RATING	ELGAR PART NUMBER	MANUFACTURER NAME	MANUFACTURER PART NUMBER
CAPACITORS						
C101	2.0 uf	Mylar	200V	822-205-53	IMB	ZA2C205J
C102,104	FSV					
C103	220 pf	Dip Mica	500V	820-221-05	ARCO	DM15-221J
C105	200 pf	Dip Mica	500V	820-201-05	ARCO	DM15-201J
C106	50 uf	Electrolytic	50V	824-506-71	Sprague	500D506G050DD7
C107	220 uf	Tantalum	10V	823-227-61	Sprague	196D227X0010MA3
C108	.0022 uf	Cer. Disc	500V	821-222-00	Erie	811-000-X5F0-222K
C109	300 pf	Dip Mica	500V	820-301-05	ARCO	DM15-301J
RESISTORS						
R101	3.32K	Metal Film	1/8W 1%	813-332-1F	Dale	RN60C3321F
R102,108,114	FSV	Carb Comp	½W 5%			
R103	5.11K	Metal Film	1/8W 1%	813-511-1F	Dale	RN60C5111F
R104,123	4.7K	Carb Comp	½W 5%	802-472-05	Speer	RC20GF472J
R105,106	6.2K	Carb Comp	½W 5%	802-622-05	Speer	RC20GF622J
R107	1.2K	Carb Comp	½W 5%	802-122-05	Speer	RC20GF122J
R109	33.2K	Metal Film	1/8W 1%	813-332-2F	Dale	RN60C3322F
R110,115,117	10K	Carb Comp	½W 5%	802-103-05	Speer	RC10GF103J
R111,112	2.2K	Carb Comp	1W 5%	803-222-05	Speer	RC32GF222J
R113,128	33 ohm	Carb Comp	½W 5%	802-330-05	Speer	RC20GF330J
R116	1.8K	Carb Comp	½W 5%	802-182-05	Speer	RC20GF182J
R118,119	68 ohm	Carb Comp	½W 5%	802-680-05	Speer	RC20GF680J
R120,122	100 ohm	Carb Comp	½W 5%	802-101-05	Speer	RC20GF101J
R121,125	15 ohm	Carb Comp	½W 5%	802-150-05	Speer	RC20GF150J
R124	1K	Potentiometer		819-102-30	Bourns	3059Y-1K
R126,127	10 ohm	Potentiometer		819-100-30	Bourns	3059Y-10 ohm
SEMICONDUCTORS						
CR101	IN5142	Zener	12V	843-524-2X	Motorola	IN5242
CR102 thru 108	IN4003	Rectifier	200V	845-400-3X	Motorola	IN4003

AMPLIFIER BOARD (Continued)

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION TYPE	RATING	ELGAR PART NUMBER	MANUFACTURER NAME	MANUFACTURER PART NUMBER
Q101,102	2N3810	Diff. Amp.		842-381-3X	National	2N3810
Q103	2N3583	Transistor		839-358-3X	RCA	2N3583
Q104	2N3567	Transistor		835-356-7X	Fairchild	2N3567
Q105	2N3638	Transistor		834-363-8X	Fairchild	2N3638
Q106	2N4912	Transistor		839-491-2X	Motorola	2N4912
Q107	2N4900	Transistor		838-490-0X	Motorola	2N4900
INDUCTORS						
L101	150 uh	Choke		851-150-01	Nytronics	SWD150
L102	470 uh	Choke		851-470-01	Nytronics	SWD470

751A CHASSIS ASSY.

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION TYPE	RATING	ELGAR PART NUMBER	MANUFACTURER NAME	MANUFACTURER PART NUMBER
C1,2,3,4,5,6	23,200 uf	Electrolytic	50V	826-239-12	G.E.	86F170M1
C7,8	.05 uf	Mylar	600V	822-503-06	Sprague	6PS-S50
CR13		Rectifier		845-702-0A	I.R.	70H20A
CR2,4		Rectifier		845-702-0R	I.R.	70HR20A
CR5		Rectifier		845-118-6	I.R.	IN1186A
CR6		Rectifier		845-118-6R	I.R.	IN1186RA
B1		Fan		853-750-01	Pamotor	7500
DS1		Lamp		854-68K-22	Eldema	BG02-RCS-AIC-68K
M1	0-150V	Meter		857-150-11	Ammon	AM1
R1	10K	Potentiometer		819-103-53	Spectrol	534-9561-10
R2,3	1K	W.W.	10W 5%	808-102-05	Dale	CW10-1K
R4	4.7 ohm	Carb Comp	½W 5%	802-4R7-05	Speer	RC20GF4R7J
R5	.025 ohm	W.W.	50W 5%	810-R02-05	Dale	RH50
CB1		Ckt. Breaker	25a	852-253-32	Airpax	UPL1-1-6-1-253
T1		Pwr. Trans.		990-159-90	Aztec	11330
T2		Output Trans.		990-246-90	Aztec	12143
T3		Current Trans.		990-137-90	Aztec	12152
			HEATSINKS			
C201,301	.015 uf	Mylar	200V	822-153-05	Sprague	192P15392
Q201 thru 211, 301 thru 311	2N6259	Transistor		841-625-9X	RCA	2N6259
R201,202,301,302	5.6 ohm	W.W.	5W 5%	807-5R6-05	Dale	CW5-5.6
R203 thru 212, 303 thru 312	.22 ohm	W.W.	5W 5%	807-R22-05	Dale	CW5-.22
S101		Thermostat		861-340-0X	Elmwood	2450-21-272

1001A CHASSIS ASSY.

SCHEMATIC DESIGNATOR	VALUE	DESCRIPTION TYPE	RATING	ELGAR PART NUMBER	MANUFACTURER NAME	MANUFACTURER PART NUMBER
B1,2		Fan		853-750-01	Pamotor	7500
C1,2,3,4	22,000 uf	Electrolytic	50V	826-229-11	Sprague	36D223G050DCZA
C5,6	.05 uf	Mylar	600V	822-503-06	Sprague	6PS-S50
CB1		Ckt. Breaker	50A	852-503-52	Airpax	UPL1-1-6-1-503
CR1,3		Rectifier		845-702-0Z	I.R.	70H20A
CR2,4		Rectifier		845-702-0R	I.R.	70HR20A
DS1		Lamp		854-68K-22	Eldema	BG02-RCS-AIC-68K
M1		Meter		857-150-12	Ammon	AM2
Q1,2		Transistor		851-434-8X	RCA	2N4348
R1	10K	Potentiometer		819-103-53	Spectrol	534-9561-10
R2,3	1K	W.W.	10W 5%	808-102-05	Dale	CW10-1K
R4	4.7 ohm	Carb Comp	½W 5%	802-4R7-05	Speer	RC20GF4R7J
R5,6	5.6 ohm	W.W.	5W 5%	807-5R6-05	Dale	CW5-5.6
R7	.025 ohm	W.W.	50W 5%	810-R02-05	Dale	RH50
T1		Pwr. Trans.		990-070-90	Aztec	10582
T2		Output Trans.		990-414-90	Aztec	12415
T3		Current Trans.		990-191-90	Aztec	11951
			HEATSINKS			
CR201,301,401,501		Rectifier		845-368-DX	Westing-house	368D
Q201 thru 208,301 thru 308, 401 thru 408, 501 thru 508		Transistor		841-434-8X	RCA	2N4348
R201 thru 208, 301 thru 308, 401 thru 408, 501 thru 508	.22 ohm	W.W.	5W 5%	807-R22-05	Dale	CW5-.22
S101		Thermostat		861-340-0X	Elmwood	2450-21-272

1501A CHASSIS ASSY.

SCHEMATIC DESIGNATOR	VALUE	DESCRIPTION TYPE	RATING	ELGAR PART NUMBER	MANUFACTURER NAME	MANUFACTURER PART NUMBER
C1,2	44,000 uf	Electrolytic	50V	826-239-12	G.E.	86F170M1
C3,4	.05 uf	Mylar	600V	822-503-06	Sprague	6PS-S50
B1,2		Fan		853-750-01	Pamotor	7500
CB1		Ckt. Breaker	15A	852-153-54	Airpax	UPG1-111-6-1-153
CR1 thru CR6	IN1186A	Rectifier		845-118-6A	I.R.	IN1186A
CR7 thru CR12	IN1186AR	Rectifier		845-118-6R	I.R.	IN1186AR
DS1		Lamp		854-68K-22	Eldema	BG02-RCS-AIC-68K
M1		Meter		857-150-1T	Jewel	MS1T
R1	10K	Potentiometer		819-103-53	Spectrol	534-9561-10
R2,3	10K	Carb Comp	2W 5%	804-103-05	Speer	RC42GF103J
R4,5	5.6 ohm	W.W.	5W 5%	807-5R6-05	Dale	CW5
R6,7	.025 ohm	W.W.	50W 5%	810-R02-05	Dale	RH50
R8	4.7 ohm	Carb Comp	½W 5%	802-4R7-05	Speer	RC20GF4R7J
Q1,2	2N6259	Transistor		841-625-9X	RCA	2N6259
T1		Pwr. Trans.		990-074-90	Aztec	10489
T2		Output Trans.		990-244-90	Aztec	11721
T3		Current Trans.		990-137-90	Aztec	12152
			HEATSINKS			
CR201,301,401,501		Rectifier		845-368-DX	Westing-house	368D
Q201 thru 208, 301 thru 308, 401 thru 408, 501 thru 508		Transistor		841-434-8X	RCA	2N4348
R201 thru208, 301 thru 308, 401 thru 408, 501 thru 508	.22 ohm	W.W.	5W 5%	807-R22-05	Dale	CW5
S101		Thermostat		861-340-0X	Elmwood	2450-21-272
			MODEL 1751			
Q201 thru 208, 301 thru 308, 401 thru 408, 501 thru 508		Transistor		841-625-9X	RCA	2N6259

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